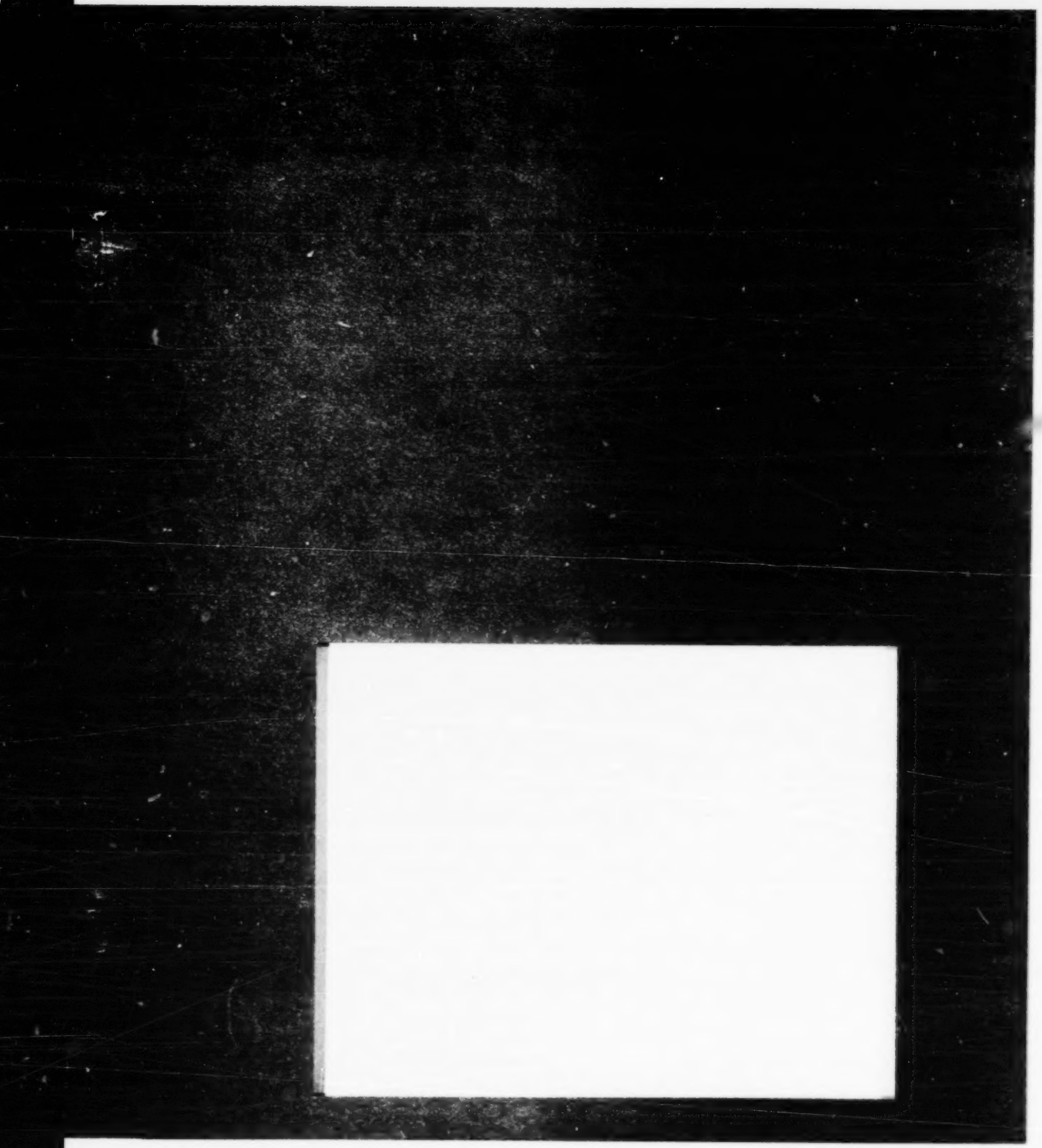

Manitoba
Energy and Mines

Petroleum

Manitoba Petroleum Royalty and Tax Information

September, 1987

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Introduction

This booklet has been assembled to provide the reader with a general overview of the petroleum royalty/tax structure and incentive programs currently operating in Manitoba. As always, the reader should consult the appropriate Acts or Regulations for final authority.

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I. Manitoba Drilling Incentive Program

With the expiry of the previous drilling incentive program on December 31, 1986, a new Manitoba Drilling Incentive Program has been developed to encourage operators to drill for oil in Manitoba.

The new program provides operators of new wells drilled after January 1, 1987 and prior to January 1, 1992 with a royalty/tax free "holiday volume" of oil. This "holiday volume" is sensitive to oil price and dependent on the well's location, depth, producing formation and qualifying credits from previous dry holes.

Each new oil well drilled in Manitoba during the program qualifies for a "holiday volume" of oil to a maximum of 10 000 m^3 or 5 years of production, whichever occurs first.

The program applies to wells drilled on either Crown or freehold owned mineral rights.

The amount of holiday oil volume will be calculated in accordance with the following equation (Schedule C of Petroleum Crown Royalty and Incentives Regulation):

HOLIDAY OIL VOLUME

$$VT = Vk + Vd + Vf + VTi(ti)$$

where:

VT = TOTAL ROYALTY HOLIDAY VOLUME (cu.m.)
Vk = DISTANCE FACTOR VOLUME (cu.m.)
Vd = DEPTH FACTOR VOLUME (cu.m.)
Vf = FORMATION FACTOR VOLUME (cu.m.)
VTi(ti) = QUALIFYING DRY HOLE VOLUME (cu.m.)

Figure 1 graphically illustrates three of the four factors that determine "holiday volume" under the new drilling incentive program while the fourth factor in the equation (Qualifying Dry Hole Volume) is determined by the following equation:

QUALIFYING DRY HOLE VOLUME VTi(ti)

VTi(ti) = sum of qualifying dry hole volumes VTi(ti) for each unallocated qualifying dry hole

where:

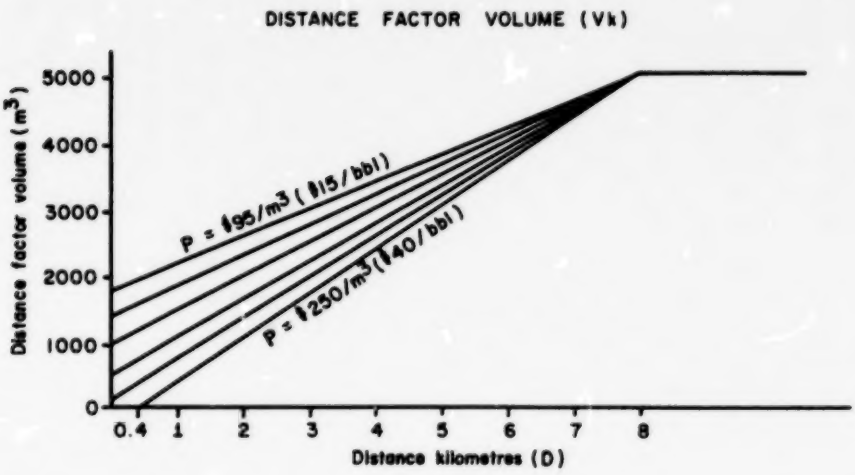
VTi = the Total Holiday Oil Volume (VT) for each previously unallocated qualifying dry hole

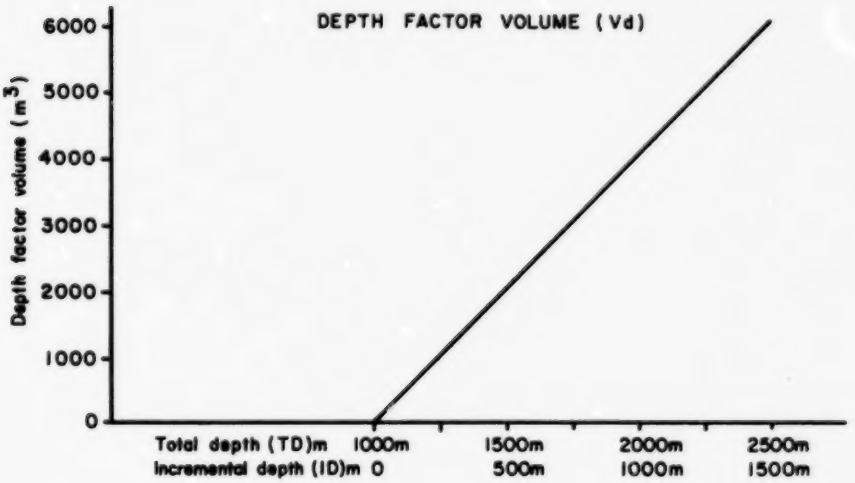
ti = the "Time Reduction Factor" for each dry hole
= 0.5, when dry hole drilled within previous year
= 0.2, when dry hole drilled more than 1 year but less than 2 years previous
= 0.0, when dry hole drilled more than 2 years previous or prior to January 1, 1987

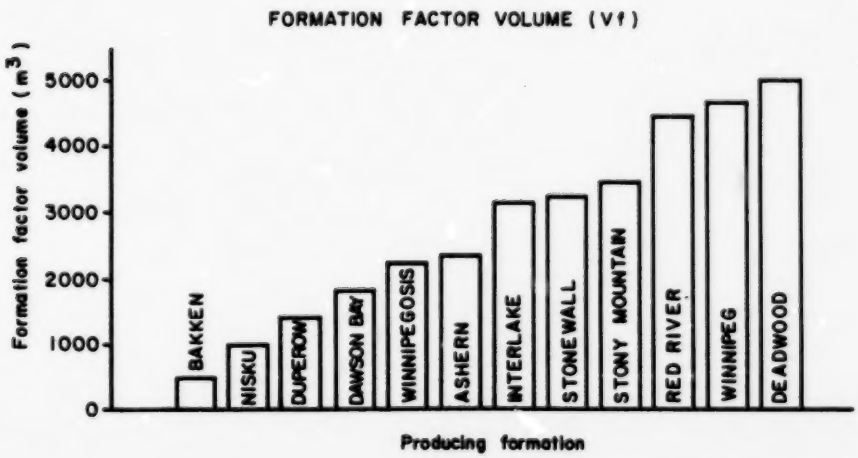
Table 1 provides examples of "holiday volumes" for several different types of wells.

FIGURE 1

HOLIDAY OIL VOLUME FACTORS







Note: Not for calculation purposes.

TABLE 1
HOLIDAY VOLUMES FOR EXAMPLE WELLS

Example	I	II	III	IV	V	VI	VII
CLASSIFICATION	Development	Exploratory (NFW)	Development	Exploratory (NFW)	Exploratory (NFW)	Exploratory (DPW)	Development
Depth (m)	850	1 000	900	1 300	2 000	2 000	850
Formation (prod.)	Lodgepole (Miss.)	Lodgepole (Miss)	Bakken (Miss.)	Lodgepole (Miss.)	Red River (Ord.)	Wpgosis(Dev.)	Lodgepole (Miss.)
Distance D (km)	0.4	8.0	0.4	4.0	8.0	0.4	0.4
Oil Price P ($/m^3)	145.00	145.00	145.00	145.00	145.00	145.00	145.00
HOLIDAY VOLUME CALCULATION:							
Distance Factor Volume V_k(m^3)	1 349	4 970	1 349	3 064	4 970	1 349	1 349
Depth Factor Volume V_d(m^3)	N/A	NIL	N/A	1 200	4 000	4 000*	N/A
Formation Factor Volume V_f(m^3)	N/A	N/A	500	N/A	4 400	2 200	N/A
Qualifying Dry Hole Volume VT_1t_1(m^3)	NIL	NIL	NIL	NIL	NIL	NIL	7 292**
TOTAL HOLIDAY Volume VT(m^3)	1 349	4 970	1 849	4 264	10 000 (max.)	7 549	8 641

* Assumes deepest well within 1.6 km was not greater than 1 000 m.
** Assumes wells in Examples II, IV and VI were dry holes drilled by operator within previous one year period.
= 0.5(4 970 + 4 264 + 5 349) = 7 292

NOTE: Formation Factor Volumes are <u>not</u> included in Qualifying Dry Hole Volume Credits.

The following two examples show the value of the Manitoba Drilling Incentive Program for a typical development well and deep exploratory well.

Assuming that the development well was .4 km from the nearest well cased for production, drilled to a depth of 850 metres when the oil price was $\$160/m^3$ ($25/bbl), and producing oil from the Mississippian Lodgepole Formation at a rate of 75 m^3/month (15 BOPD), the total calculated holiday volume would be 1 155 m^3. This would equate to a holiday production period of 15.4 months and would result in a Crown royalty saving to the operator of approximately $28,000.

Assuming that the exploratory well was 8 km from the nearest well cased for production, drilled to a depth of 2 000 metres when the oil price was $\$160/m^3$ ($25/bbl) and producing oil from the Winnipegosis Formation at a rate of 250 m^3/month (50 BOPD), the total calculated holiday volume would be limited to the maximum volume of 10 000 m^3. This would equate to a holiday production period of 40 months and would result in a Crown royalty saving to the operator of approximately $350,000.

It should be noted that the above examples do not include any qualifying dry hole credits from previous unsuccessful wells.

II. Enhanced Oil Recovery Incentive Program

For the first time in Manitoba, an incentive program has been designed to encourage maximization of oil reserves through enhanced oil recovery projects.

Wells in qualifying new or enlarged enhanced oil recovery projects approved under The Mines Act, after January 1, 1987, and fully implemented prior to January 1, 1992, will be eligible for an EOR incentive period (maximum of 60 months) based on the initial oil production rate and the average initial water cut for wells in the project.

Eligible projects will be granted reduced royalty and tax rates equivalent to 35% of the base Crown oil royalty rate charged on "old oil" in the case of Crown wells and the corresponding freehold oil tax "incentive rate" (Schedule A, Section 3 - Oil and Gas Production Tax Regulation).

The length of the incentive period offered through the Enhanced Oil Recovery Program is calculated by the following formula:

ENHANCED OIL RECOVERY PROGRAM

$$EORIP = Io + Iwc$$

where: EORIP = Total incentive period in producing months(maximum of 60)

$Io = 72 - 9q$

Io = qualifying EOR Incentive Period based on average Initial Oil Production Rate.

q = Average Daily Oil Production Rate during first four (4) producing months.

$Iwc = wc / 2.5$ (maximum 24 months)

Iwc = qualifying EOR Incentive Period based on the average Initial Water Cut.

wc = Average Water Cut during first four (4) producing months.

Figure 2 graphically illustrates the allowable incentive period eligibility based on initial oil production and water cut.

Figures 3 & 4 provide an example of the incentive period calculation for a four (4) well project.

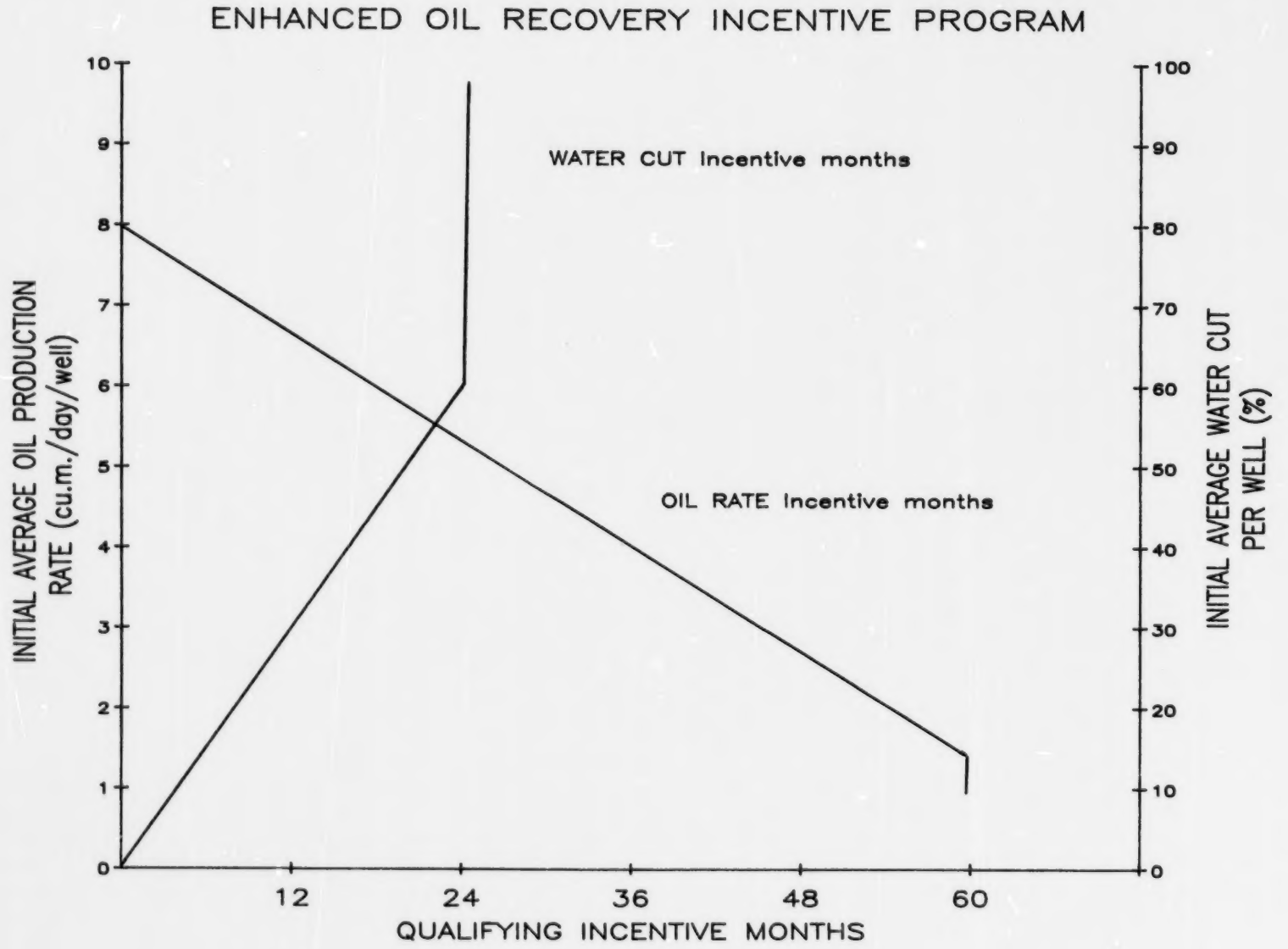

ENHANCED OIL RECOVERY INCENTIVE PROGRAM
INITIAL AVERAGE OIL PRODUCTION RATE (cu.m./day/well)
INITIAL AVERAGE WATER CUT PER WELL (%)
WATER CUT Incentive months
OIL RATE Incentive months
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
70
80
90
100
12
24
36
48
60
QUALIFYING INCENTIVE MONTHS

FIGURE 2

FIGURE 3

EXAMPLE

EOR INCENTIVE CALCULATION

Assume:

- -4 well project
- -each well produced 500 cu.m. oil in first 4 producing months
- -each well produced 760 cu.m. water in first 4 producing months
- -each well produced for 30 days / month (120 days)

Average Initial Oil Production q =(500 * 4)/(120 * 4)= 4.17 cu.m. / day

Io = 72 - 9(q)
= 72 - 9(4.17)
= 34.5
= 35 months

Average Initial Water Cut (wc) = (4(760) / 4(500 + 760)) * 100 = 60.3%

Iwc = wc / 2.5
= 60.3 / 2.5
= 24.1
= 24 months

EORIP = Io + Iwc
= 35 + 24
= 59 Producing Months

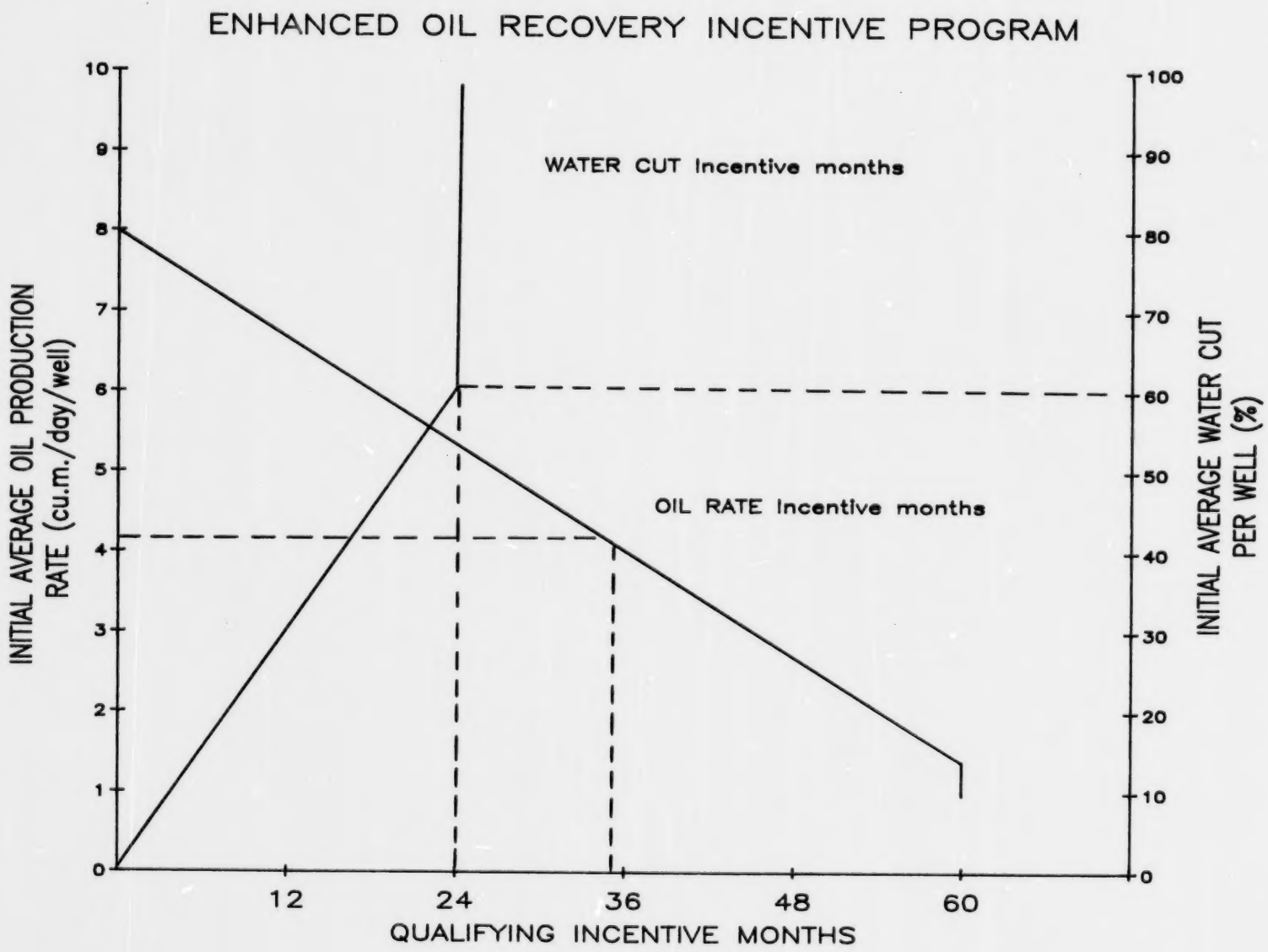

ENHANCED OIL RECOVERY INCENTIVE PROGRAM
WATER CUT Incentive months
OIL RATE Incentive months
INITIAL AVERAGE OIL PRODUCTION RATE (cu.m./day/well)
INITIAL AVERAGE WATER CUT PER WELL (%)
QUALIFYING INCENTIVE MONTHS
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
70
80
90
100
12
24
36
48
60

FIGURE 4

Summary

Both incentive programs are designed to provide greater encouragement for new exploratory well drilling while also assisting development drilling and ensuring maximum oil recovery from existing wells through enhanced recovery. In combination with the competitive Crown royalty and freehold tax rates which prevail in Manitoba, these new incentive programs provide active operators with immediate benefits and enable long range planning.

III. Provincial Crown Oil Royalties

Act: The Mines Act, (Cap. M160)

Regulation: Petroleum Crown Royalty and Incentives Regulation (MR 63/87 as amended by MR 264/87)

Effective Date: January 1, 1987

Administered By: Manitoba Energy and Mines (Petroleum)

The Petroleum Crown Royalty and Incentives Regulation governs Crown royalties with provisions for four (4) associated classifications of oil for royalty purposes, namely:

(1) "Holiday Oil" being the initial calculated volume of oil produced from a well drilled after December 31, 1986 which is exempt from Crown royalties and taxes.

(2) "Incentive Oil" being oil produced from a new well drilled prior to January 1, 1987 during the well's "royalty/production incentive period", and

oil produced from a new or enlarged enhanced recovery project during the "EOR incentive period" for the project.

(3) "New Oil" being oil produced from a well drilled on or after April 1, 1974 which is no longer "holiday oil" nor "incentive oil".

(4) "Old Oil" being oil produced from wells drilled prior to April 1, 1974 that does not qualify as "incentive oil" or "new oil".

The base or "Old Oil" royalty is the volume of Crown royalty oil calculated using the formula shown in Table 2.

These calculated base rates apply to "Old Oil" produced from Crown owned mineral rights.

The Crown royalty volume for oil produced from a well or spacing unit is the base Crown royalty volume as calculated by the formula in Table 2 multiplied by the appropriate Calculation Factor for that Oil Classification.

Table 2 also provides examples of monthly production rates and the corresponding Crown Royalty rate (expressed as a percentage) for each oil classification. Figure 5 provides a graphical illustration of these rates.

Note: Section 9 of the Regulation provides for the approval by Cabinet of the temporary or permanent reduction or exemption of Crown royalties charged on any oil or natural gas production where special circumstances are justified.

Table 2

Crown Oil Royalties

Base Formula:

Monthly Production per well in cubic metres (P)	Crown Royalty for the month in cubic metres (P)
0 - 50	$P^2 \div 265$
50 and over	9.43 + 0.45 (P-50)

Oil Classification	Calculation Factor
Old Oil	1.00
New Oil	0.55
Incentive Oil	0.35
Holiday Oil	0.00

Crown Royalty (m^3) = Base Formula x Calculation Factor

Crown Royalty (%) = (Base Formula x Calculation Factor) ÷ Monthly Production

Sample Crown Royalty Rates (%)

Monthly Production (P) m^3/month	Holiday Oil	Incentive Oil	New Oil	Old Oil
20	Nil	2.6	4.1	7.5
50	Nil	6.6	10.4	18.9
100	Nil	11.2	17.6	31.9
250	Nil	13.9	21.9	39.8
500	Nil	14.8	23.3	42.4

IV. Provincial Freehold Oil Tax

Act: The Oil and Gas Production Tax Act, (Cap. 037)

Regulation: Oil and Gas Production Tax Regulation

Effective Date: April 1, 1987

Administered By: Manitoba Finance (Mining and Use Taxes)

The Oil and Natural Gas Production Tax Act (previously titled The Oil and Natural Gas Tax Act, Cap. 035) levies a monthly production tax on oil and natural gas from a well or spacing unit producing from freehold oil and gas rights.

The Act stipulates that the operator of the well is responsible for payment of the tax on any freehold oil or gas production. The mineral rights owner's and any other royalty owner's and working interest owner's share of the tax is deducted from the payment made to them by the operator from sales revenue.

Where a working interest owner takes his oil in kind and markets this oil, he may be designated as a special operator and is responsible for the filing of returns and payment of the tax for his share of production.

Taxes levied on oil production from freehold oil and gas rights are dependent on the monthly production rate of the well (in cubic metres) and the appropriate oil classification (similar to Crown oil royalties).

The regulation calculates taxes as a percent in accordance with the formulae shown in Table 3 for the appropriate oil classification. Figure 6 provides a graphical illustration of these rates.

Table 3

Freehold Oil Taxes

Formula by Oil Classification:

Oil Classification	Monthly Oil Production per well in cubic metres (P)	Oil Tax Rate for the well in % of production
Old Oil	- 20.0 or less:	Nil
	- more than 20.0 but less than 65.0:	$(0.43P - 8.24)$
	- 65.0 or more:	$(42.76 - \frac{1\,500}{P})$
New Oil	- 36.0 or less:	Nil
	- more than 36.0 but less than 65.0:	$(0.23P - 8.11)$
	- 65.0 or more:	$(19.59 - \frac{820}{P})$
Incentive Oil	- 56.0 or less:	Nil
	- more than 56.0:	$(9.27 - \frac{510}{P})$
Holiday Oil	- All Volumes:	Nil

Freehold Oil Tax Liability* (%)

Prod. Rate of well (m^3/month)	Holiday Oil		Incentive Oil		New Oil		Old Oil	
	Gross Tax	Net Tax	Gross Tax	Net Tax	Gross Tax	Net Tax	Gross Tax	Net Tax
20	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
50	Nil	Nil	Nil	Nil	3.4	2.9	13.3	11.3
100	Nil	Nil	4.2	3.6	11.4	9.7	27.8	23.6
250	Nil	Nil	7.2	6.1	16.3	13.9	36.8	31.3
500	Nil	Nil	8.3	7.0	18.0	15.3	39.8	33.8

* This table illustrates an operator's gross and net tax rates as a percent of total production assuming a 15% freehold royalty lease.

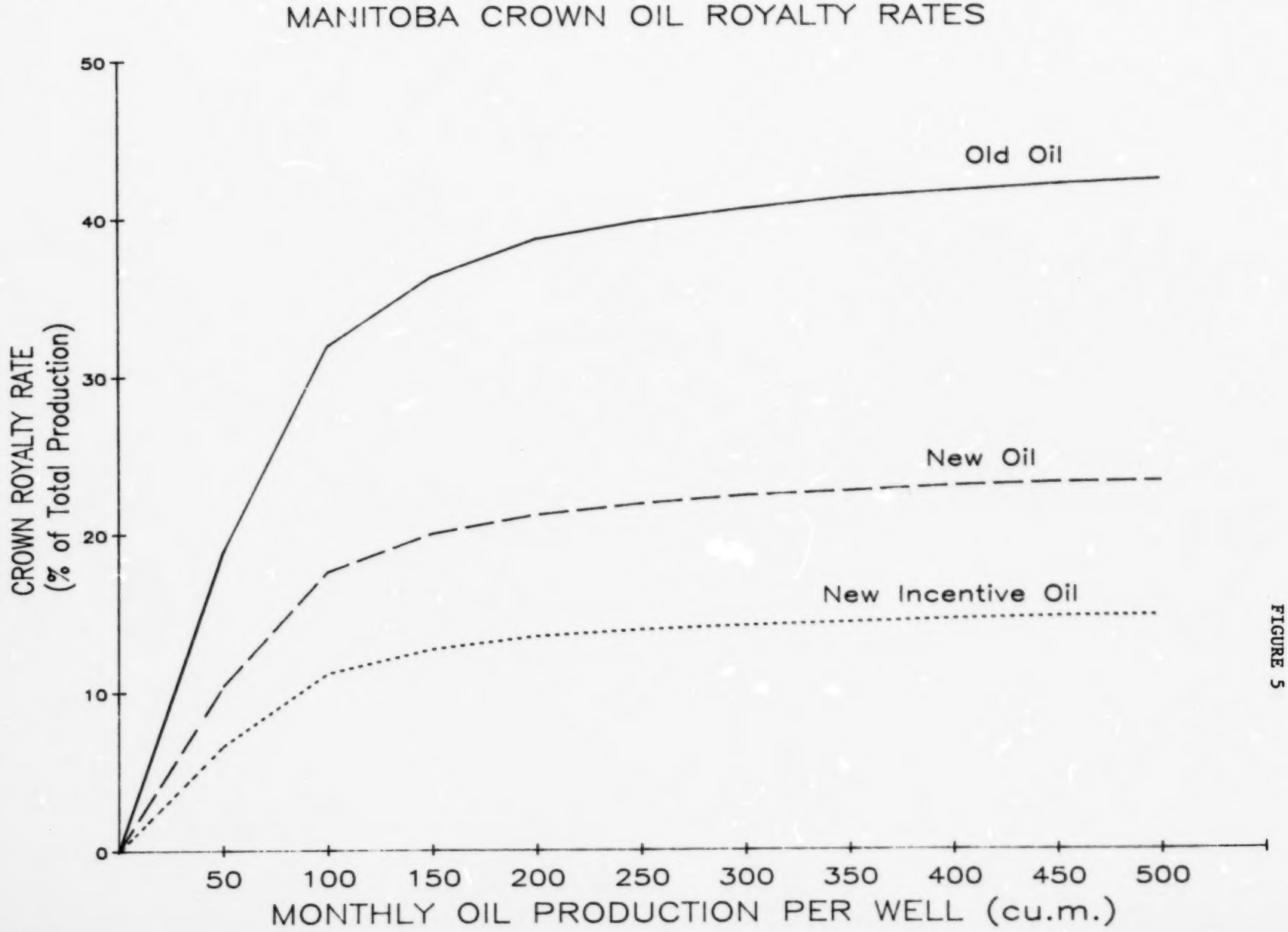

MANITOBA CROWN OIL ROYALTY RATES
CROWN ROYALTY RATE
(% of Total Production)
50
40
30
20
10
0
Old Oil
New Oil
New Incentive Oil
50
100
150
200
250
300
350
400
450
500
MONTHLY OIL PRODUCTION PER WELL (cu.m.)

FIGURE 5

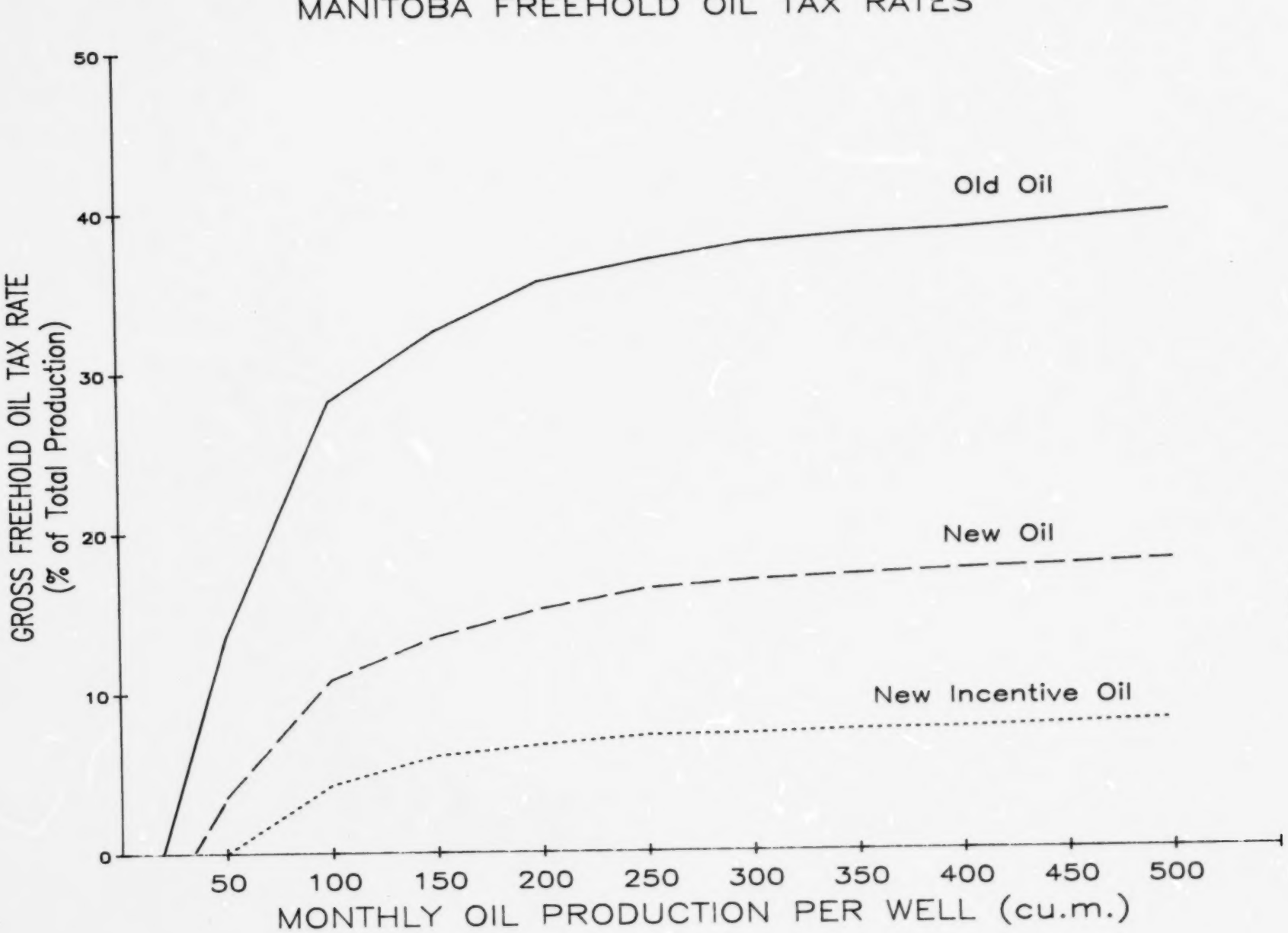

MANITOBA FREEHOLD OIL TAX RATES
GROSS FREEHOLD OIL TAX RATE
(% of Total Production)
50
40
30
20
10
0
Old Oil
New Oil
New Incentive Oil
50
100
150
200
250
300
350
400
450
500
MONTHLY OIL PRODUCTION PER WELL (cu.m.)

FIGURE 6

V. Provincial Gas Royalties and Taxes

The provincial Crown royalty payable on natural gas produced during each calendar month from a well or allocated to a spacing unit producing from Crown oil and gas rights is 12 1/2% of the volume consumed or sold off the location (The Mines Act, MR 63/87 - Sec. 3(b).

The provincial freehold tax payable on natural gas produced from a well or allocated to a spacing unit producing from freehold oil and gas rights is 1.2% (The Oil and Gas Production Tax Act, Sec. 3 & Schedule to Regulation).

VI. Provincial Corporate Income Taxes

Any corporation that maintains a permanent establishment in Manitoba at any time in the year will be subject to a corporate income tax. The basic rate of corporate income tax in Manitoba is 17 percent for corporations whose taxable income exceeds $200,000 and 10 percent where income is less than this amount.

It should be noted that in calculating income taxes, gross freehold royalty payments and the resource allowance are deductable.

VII. Other Grants and Allowances

In addition to available provincial government petroleum incentives, operators are also eligible for a number of federally sponsored programs which have been designed to encourage continued oil exploration and development in Canada. Some of these programs are briefly discussed below.

1. Canadian Exploration and Development Incentive Program - CEDIP

This grant program will pay a third (33 1/3%) of a company's eligible expenses to an annual spending limit of $10 million on or after April 1, 1987. A qualified person/company who incurs $10 million of eligible expenses will be entitled to receive maximum incentives of $3.33 million. The program is intended to remain in effect at the 33 1/3% incentive rate at least until the end of September 1988.

Example:

A well costing $180,000 to drill would result in the eligible company receiving a grant of $60,000 through CEDIP (after CEDIP well cost = $120,000).

Note: For further details see "Proposed Rules for the Canadian Exploration and Development Incentive Program" handbook - Energy, Mines and Resources Canada, April, 1987).

2. Resource Allowance

The resource allowance provides oil and gas producers with a deduction in computing income which is equal to 25 percent of certain resource profits. These profits include production income from oil and gas wells and oil and gas production royalties received by the taxpayer less deductible costs and expenses assignable to such income (i.e. - production/operating costs).

With the 25% resource allowance, the maximum federal and provincial tax rates are reduced by 9% and 4.25 % from 36% and 17% respectively (ignoring the federal surtax).

Federal legislation should be consulted for full details on the applicability of the 25% resource allowance.

3. Other Programs

Other federal allowances and deductions which exist for oil and gas production include the: Canadian Exploration Expense (CEE), Canadian Development Expense (CDE), Canadian Oil and Gas Property Expense (COGPE) and Depletion allowances.

VIII. Pricing

As of June 1, 1985, oil producers are able to negotiate sales contracts directly with crude oil purchasers with market forces determining the price of oil.

Most purchasers of Manitoba crude oil production issue price bulletins indicating the price for the various qualities of crude oil produced in Manitoba.

IX. Producer Netbacks and Well Payout

1. Table 4 provides an example of netback calculations for oil production from both Crown and freehold owned mineral rights.

   The examples assume that in each case the well produces 75 m^3 of oil per month and the wellhead price is $157.30 per cubic metre ($25/bbl).

2. Figure 7 shows a crude oil price forecast from 1987 - 1992 along with 2 well production scenarios for a 193 m^3/month well (declining at 10%/year) and a 97 m^3/month well (declining at 20%/year).

Figures 8 to 11 show the resulting payout periods for an exploratory and a development well on both Crown and freehold owned mineral rights in a "before" and "after" tax situation (Refer to production rates as shown in Figure 7).

These examples also take account of the eligible holiday volume from the Manitoba Drilling Incentive Program.

TABLE 4
MANITOBA CRUDE OIL NETBACKS
JULY 1987

ROYALTY/TAX CLASSIFICATION:		HOLIDAY OIL	INCENTIVE OIL**	NEW OIL	OLD OIL
Well Production Rate	m^3/mth (BOPD)	75(15)	75(15)	75(15)	75(15)
Wellhead Price (WHP)	$/$m^3$/($/bbl)	157.32(25.00)	157.32(25.00)	157.32(25.00)	157.32(25.00)
Operating Cost (OC)*	$/$m^3$/($/bbl)	33.35(5.30)	33.35(5.30)	33.35(5.30)	33.35(5.30)

MINERAL RIGHTS		CROWN	FREEHOLD	CROWN	FREEHOLD	CROWN	FREEHOLD	CROWN	FREEHOLD
Oil Royalty/Tax Classification		Holiday Oil	Holiday Oil	Incentive Oil	Incentive Oil	New Oil	New Oil	Old Oil	Old Oil
Provincial Crown Royalty	$/$m^3$ (%)	0.00	N/A	15.18(10)	N/A	23.86(15)	N/A	43.38(28)	N/A
Freehold Royalty (FR)	$/$m^3$ (%)	N/A	23.60(15)	N/A	23.60(15)	N/A	23.60(15)	N/A	19.67(12.5)
Provincial Oil Tax	$/$m^3$ (%)	N/A	0.00	N/A	3.78(2)	N/A	13.69(9)	N/A	36.34(23)
Producer's Share	$/$m^3$ (%)	N/A	0.00	N/A	3.21(85)	N/A	11.63(85)	N/A	31.80(87.5)
Freeholder's Share	$/$m^3$ (%)	N/A	0.00	N/A	.57(15)	N/A	2.07(15)	N/A	4.54(12.5)
"Before Tax" Netbacks									
Producer	$/$m^3$	123.97	100.37	108.79	97.16	100.11	88.74	80.59	72.50
Freeholder	$/$m^3$	N/A	23.60	N/A	23.03	N/A	21.53	N/A	15.13
Income Taxes (Maximum):									
Producer Fed. Corp. (@37.8%)	$/$m^3$	35.15	28.45	35.15	28.45	35.15	28.45	35.15	29.57
Producer Prov. Corp.(@ 17.0%)	$/$m^3$	15.81	12.80	15.81	12.80	15.81	12.80	15.81	13.30
Freeholder Fed. (@20%)	$/$m^3$	N/A	3.54	N/A	3.54	N/A	3.54	N/A	2.95
Freeholder Prov. (@10%)	$/$m^3$	N/A	1.77	N/A	1.77	N/A	1.77	N/A	1.48
"After Tax" Netbacks"									
Producer (Minimum)	$/$m^3$	73.02	59.12	57.83	55.91	49.16	47.52	29.63	29.63
Freeholder	$/$m^3$	N/A	18.29	N/A	17.72	N/A	16.22	N/A	10.70
Wellhead Revenue Distribtion (After Tax)									
Federal Gov.	$/$m^3$ (%)	35.15(22.3)	31.99(20.3)	35.15(22.3)	31.99(20.3)	35.15(22.3)	31.99(20.3)	35.15(22.3)	32.52(20.7)
Prov. Gov.	$/$m^3$ (%)	15.81(10.1)	14.57(9.3)	30.99(19.7)	18.35(11.7)	39.67(25.2)	28.23(17.9)	59.19(37.6)	51.12(32.5)
Freeholder	$/$m^3$ (%)	N/A (N/A)	18.29(11.6)	N/A (N/A)	17.72(11.3)	N/A (N/A)	16.22(10.3)	N/A (N/A)	10.70(6.8)
Operating Costs	$/$m^3$ (%)	33.35(21.2)	33.35(21.2)	33.35(21.2)	33.35(21.2)	33.35(21.2)	33.35(21.2)	33.35(21.2)	33.35(21.2)
Producer	$/$m^3$ (%)	73.02(46.4)	59.12(37.6)	57.83(36.8)	55.91(35.5)	49.16(31.3)	47.52(30.3)	29.63(18.9)	30.10(18.8)

* Operating Costs estimated at $2500/Well/Month
** Incentive oil can be produced under the Enhanced Oil Recovery or previous Manitoba Drilling Incentive Programs.

Income Tax = .75 (WHP-OC-FR) (Fed/Prov Inc Tax Rate)

MANITOBA CRUDE OIL PRICE FORECAST (1987–1992) & WELL PRODUCTION DECLINE SCENARIOS

CASE A – 193 M3/MONTH @ 10% ANNUAL DECLINE
CASE B – 97 M3/MONTH @ 20% ANNUAL DECLINE

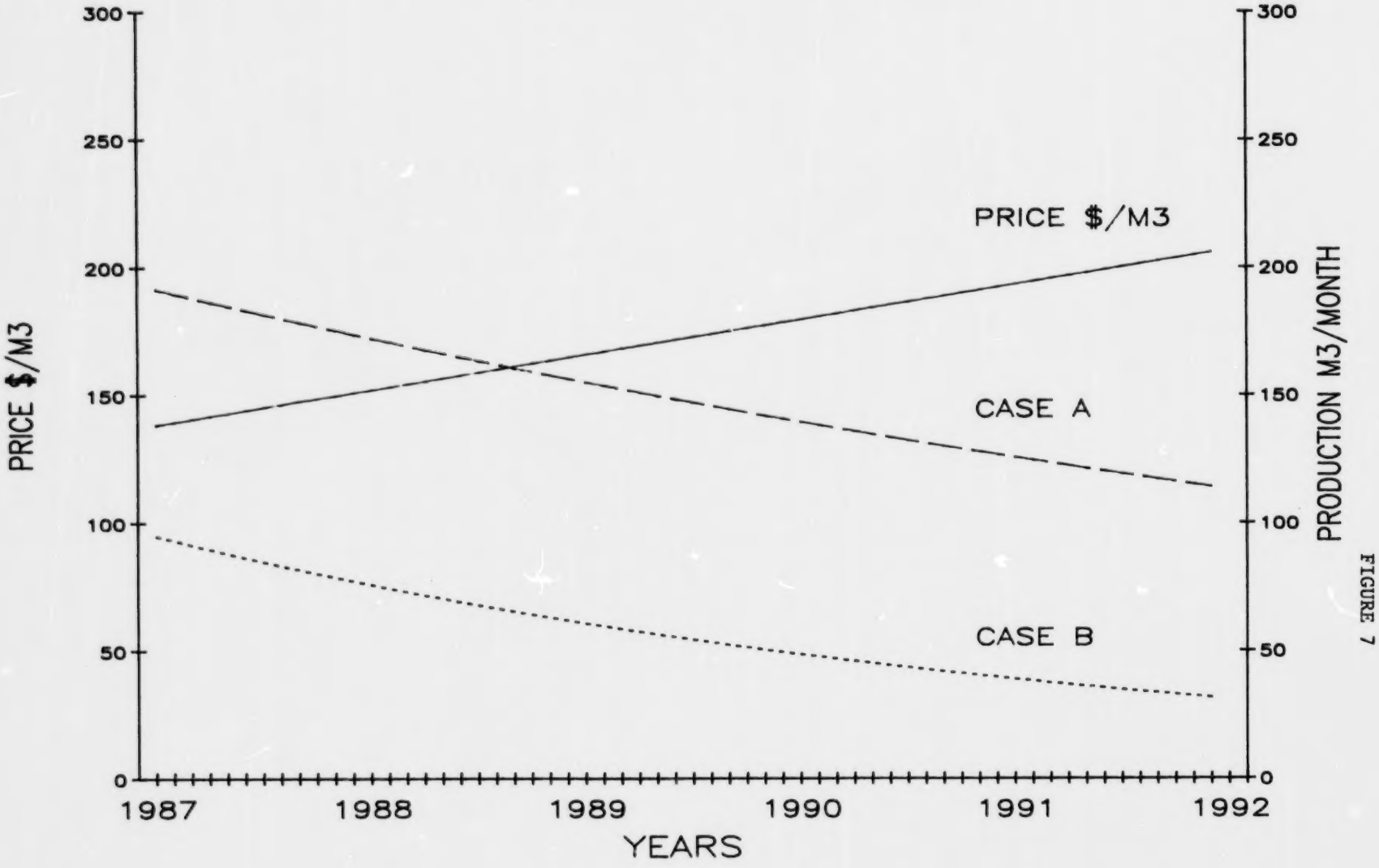


FIGURE 7

"BEFORE TAX" **EXPLORATORY** WELL PAYOUT

*INCLUDES CEDIP FOR A $180,000 WELL

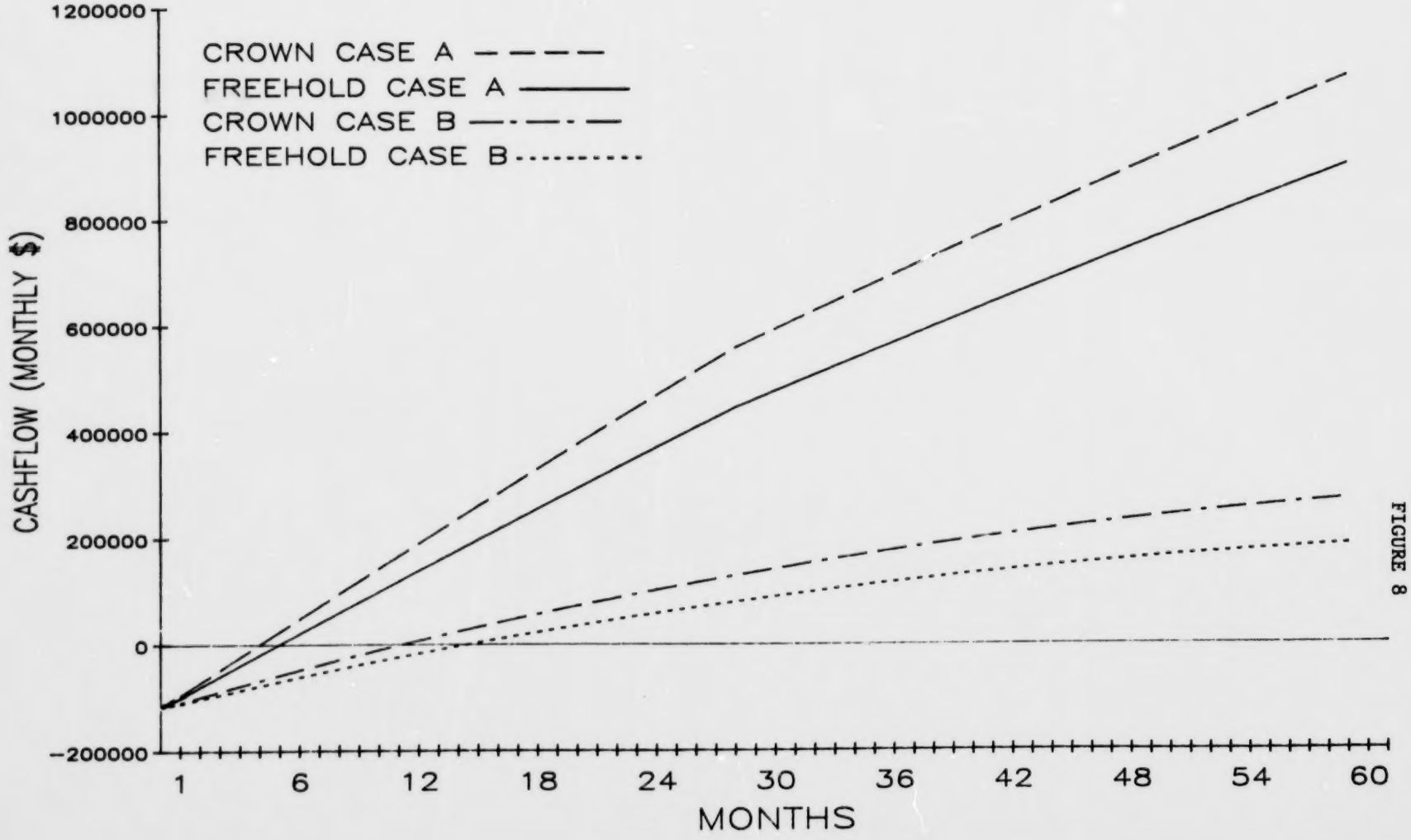


FIGURE 8

"AFTER TAX " EXPLORATORY WELL PAYOUT

*INCLUDES CEDIP FOR A $180,000 WELL

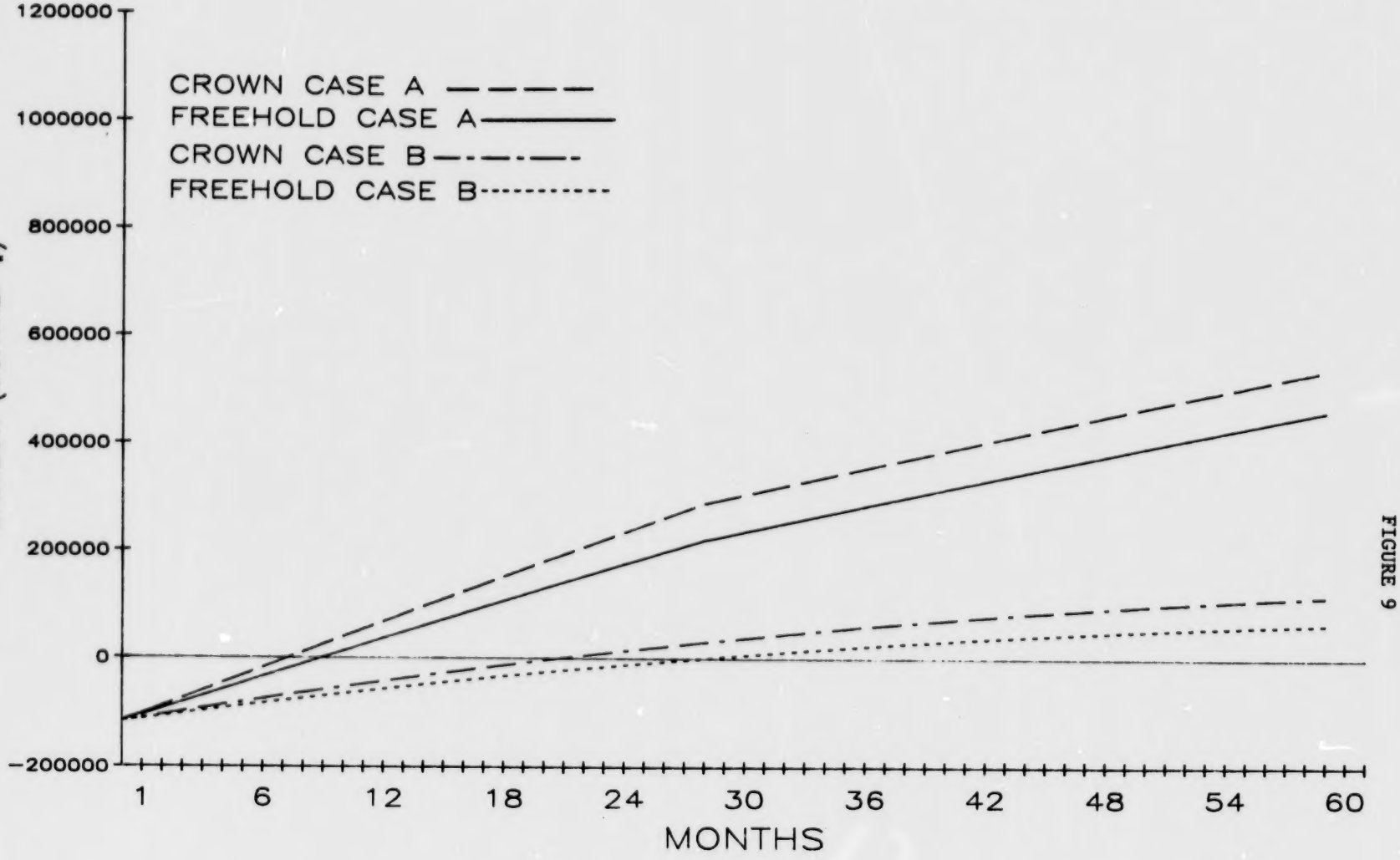


FIGURE 9

"BEFORE TAX" DEVELOPMENT WELL PAYOUT

*INCLUDES CEDIP FOR A $180,000 WELL

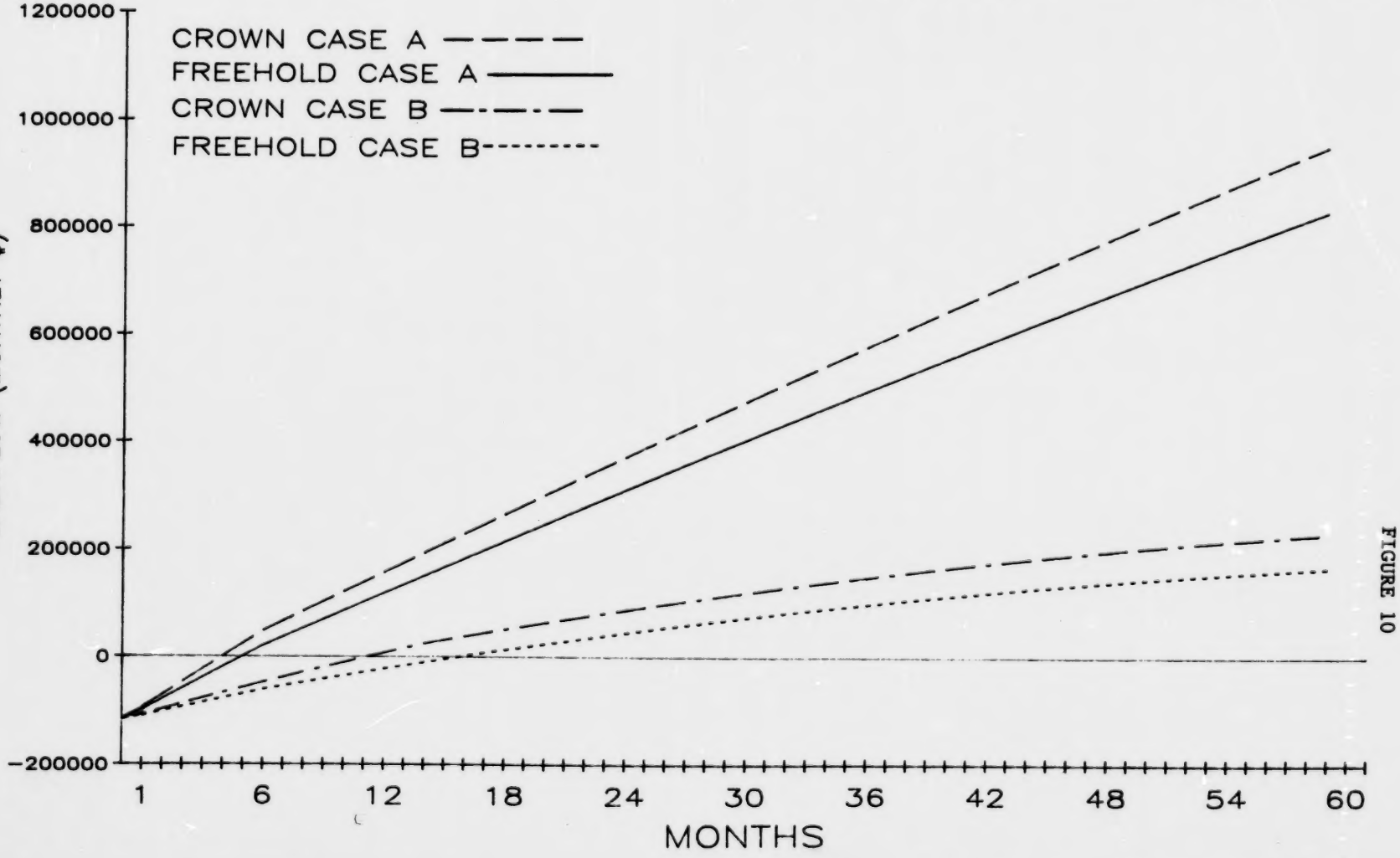


FIGURE 10

"AFTER TAX" **DEVELOPMENT** WELL PAYOUT

*INCLUDES CEDIP FOR A $180,000 WELL

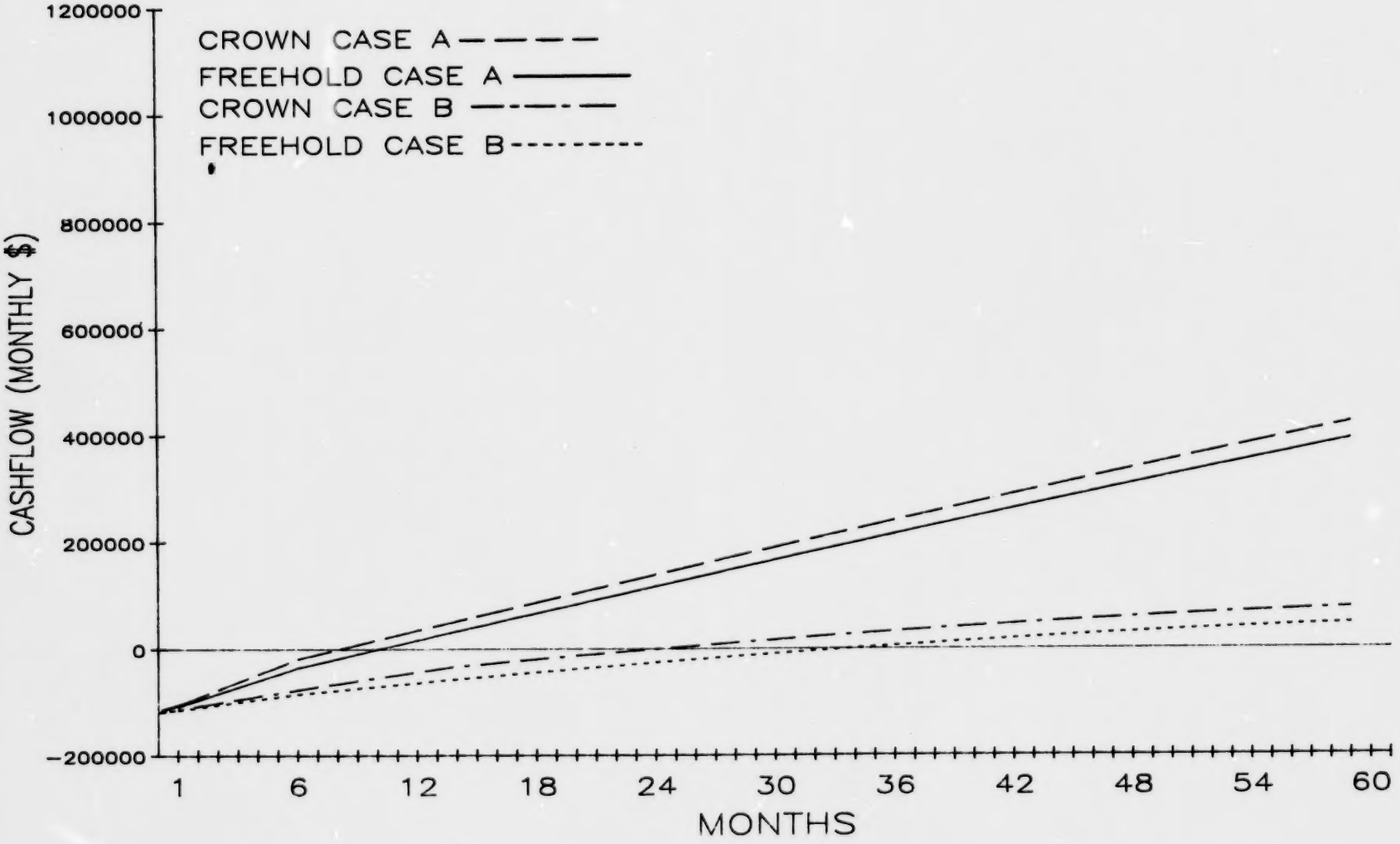
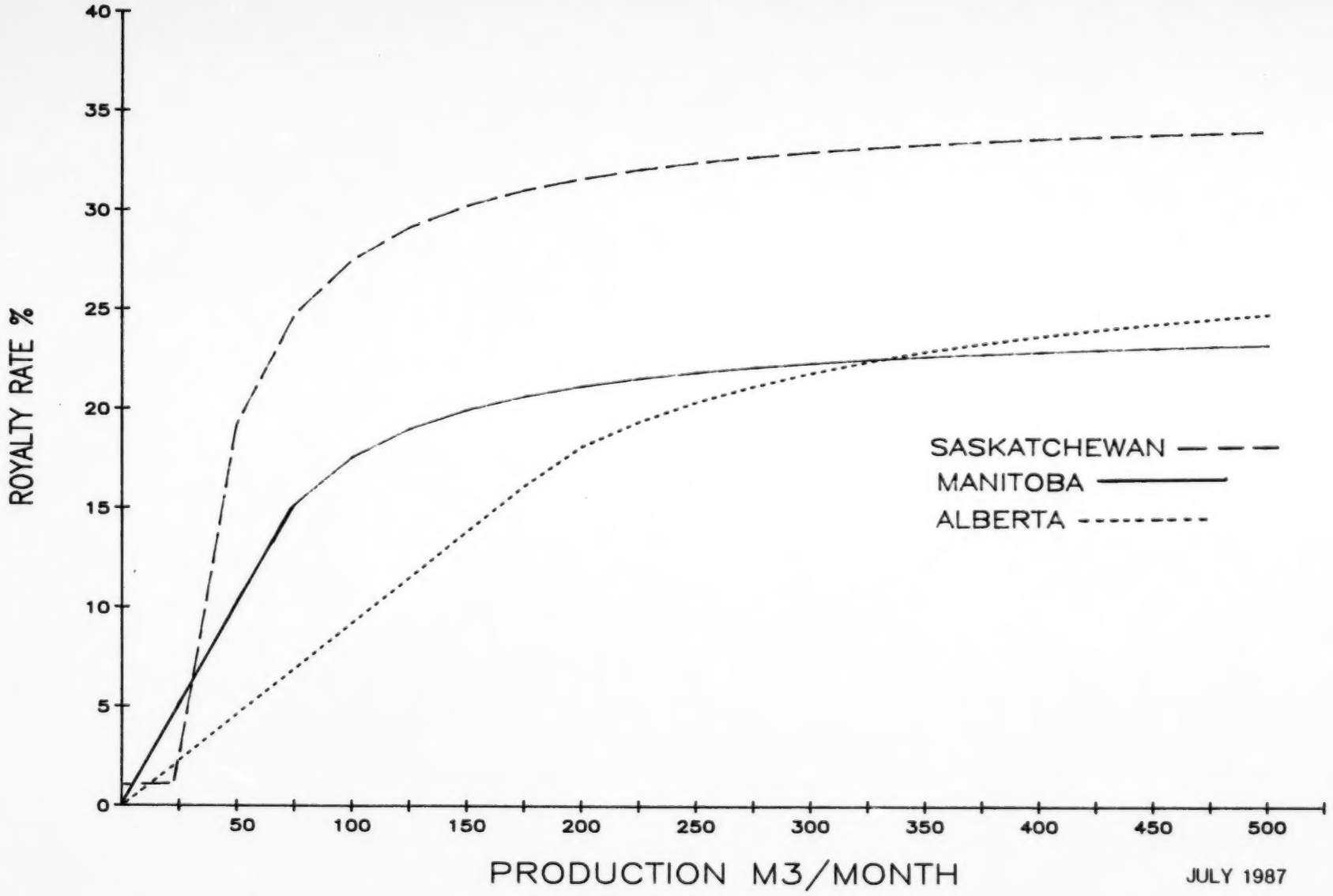


FIGURE 11

ATTACHMENTS

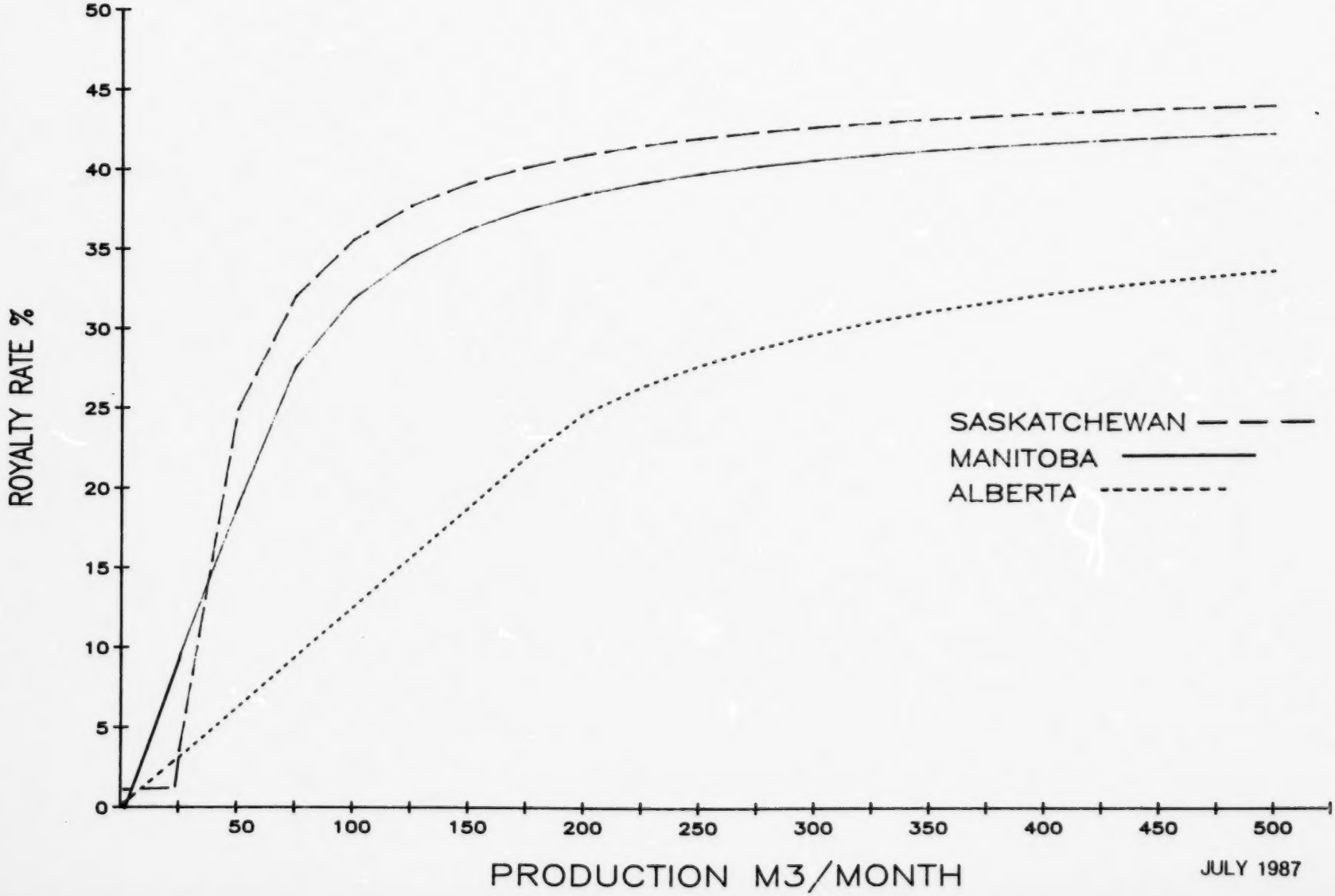
PROVINCIAL CROWN ROYALTY COMPARISONS
"NEW OIL"



JULY 1987

ATTACHMENT 1

PROVINCIAL CROWN ROYALTY COMPARISONS
"OLD OIL"

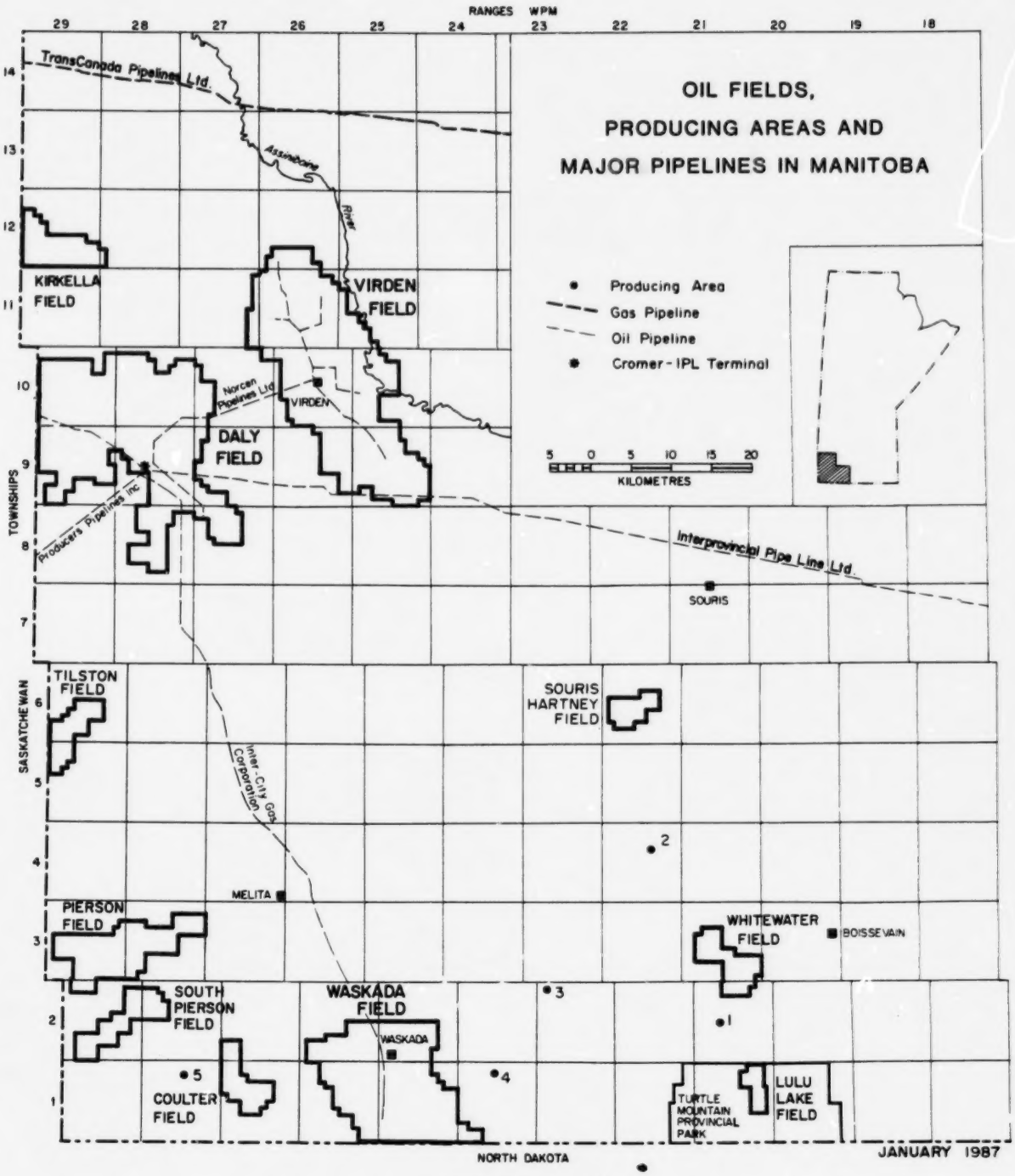


ATTACHMENT 2

JULY 1987

GEOLOGICAL FORMATIONS IN MANITOBA

AGE Millions of years before present	ERA	PERIOD	EPOCH	FORMATION	MEMBER	MAX THICK (m)	BASIC LITHOLOGY
	CENOZOIC	QUATERNARY	RECENT				TOP SOIL, DUNE SANDS
			PLEISTOCENE	GLACIAL DRIFT		140	CLAY, SAND, GRAVEL, BOULDERS, PEAT
		TERTIARY	PLIOCENE MIOCENE OLIGOCENE EOCENE				
50			PALEOCENE	TURTLE MTN.	PEACE GARDEN GOODLANDS	120	SHALE, CLAY AND SAND, LIGNITE BEDS LOCATED ONLY IN TURTLE MOUNTAIN
65	MESOZOIC	CRETACEOUS	UPPER CRETACEOUS	BOISSEVAIN		30	SAND AND SANDSTONE, GREENISH GREY, LOCATED ONLY IN TURTLE MOUNTAIN
				RIDING MTN.	[illegible]	310	GREYSHALES—NON-CALC, LOCAL IRONSTONE BENTONITE NEAR BASE, GAS FOUND
				VERMILION RIVER	PEMBINA	155	SHALE DARK GREY CARBONACEOUS NON-CAL, BENTONITE BANDS
					BOYNE		SHALE GREY SPECKLED CALC, BENTONITIC SLIGHTLY PETROLIFEROUS
					MORDEN		SHALE DARK GREY NON-CALC, CONCRETIONS, LOCAL AND SILT
				FAVEL		40	GREY SHALE WITH HEAVY CALCAREOUS SPECKS BANDS LIMTESTONE AND BENTONITE
100				ASHVILLE		115	SHALE, DARK GREY, NON-CALC, SILTY
			LOWER CRETACEOUS	ASHVILLE SAND			SAND ZONE: 27m F G QTZ S, OR SS
				SWAN RIVER		75	SANDSTONE AND SAND, QTZ, PYRITIC SHALE—GREY, NON-CALC
150		JURASSIC	UPPER JURASSIC	WASKADA		200	BANDED GREEN SHALE AND CALC. SANDSTONE
				MELITA			BANDS OF LIMESTONE, VARI-COLORED SHALE
			MIDDLE JURASSIC	RESTON		45	LIMESTONE, BUFF AND SHALES, GREY
				AMARANTH	UPPER EVAPORITE	45	WHITE ANHYDRITE AND/OR GYPSUM AND BANDED DOLOMITE AND SHALE
200					LOWER RED BEDS	40	RED SHALE TO SILTSTONE-DOLOMITIC **OIL PRODUCING**
		TRIASSIC					
	PALEOZOIC	PERMIAM	(?)	ST. MARTIN COMPLEX		300	CARBONATE BRECCIA, TRACHYANDESITE (CRYPTO-EXPLOSION STRUCTURE)
250		PENNSYLVANIAN					
		MISSISSIPPIAN		MADISON GROUP: CHARLES		20	MASSIVE ANHYDRITE AND DOLOMITE
300				MISSION CANYON	MC-3	120	LIMESTONE—LIGHT BUFF OOLITIC FOSS FRAG CHERTY BANDS SHALE AND ANHYDRITE **OIL PRODUCING**
					MC-2		
					MC-1		
				LODGEPOLE	FLOSSIE LAKE WHITEWATER LAKE VIRDEN	185	LIMESTONE & ARG. LIMESTONE LIGHT BROWN AND REDDISH MOTTLED ZONES OF SHALEY OOLITIC CRINOIDAL & CHERTY **OIL PRODUCING**
				BAKKEN	UPPER MIDDLE LOWER	20	2 BLACK SHALE ZONES SEPARATED BY SILTSTONE **OIL PRODUCING**
350		DEVONIAN		SASK GROUP: LYLETON		35	RED SILTSTONE AND SHALE DOLOMITIC
				NISKU		40	LIMESTONE & DOLOMITE, YELLOW-GREY FOSS, POROUS, SOME ANHYD
				DUPEROW		170	LIMESTONE & DOLOMITE, ARG. & ANHYDRITIC IN PLACES
				MAN GROUP: SOURIS RIVER 1 ST RED		120	CYCLICAL SHALE, LIMESTONE & DOLOMITE ANHYDRITE
				DAWSON BAY 2 ND RED		65	LIMESTONE & DOLOMITE, POROUS, ANHYDRITE—LOCAL SHALE RED & GREEN
				ELK POINT G: PRAIRIE EVAP		120	SALT POTASH & ANHYDRITE, DOLOMITE INTER—BEDDED
				WINNIPEGOSIS		75	DOLOMITE, LIGHT YELLOWISH BROWN REEFY
				ELM POINT			LIMESTONE—FOSS, HIGH CALCIUM
400				ASHERN		12	DOLOMITE AND SHALE—BRICK RED
		SILURIAN		INTERLAKE GROUP		135	DOLOMITE YELLOWISH—ORANGE TO GREYISH—YELLOW FOSS, SILTY ZONES
		ORDOVICIAN		STONEWALL		15	DOLOSTONE, GREYISH YELLOW, BEDDED
				STONY MOUNTAIN	WILLIAMS	30	DOLOMITE—YELLOWISH—GREY SHALEY
					GUNTON		
					PENITENTIARY		DOLOMITE—DUSKY—YELLOW FOSS
					GUNN	20	SHALE RED—GREEN FOSS, LIMESTONE BANDS
450				RED RIVER	FORT GARRY SELKIRK CATHEAD DOG HEAD	170	DOLOMITIC LIMESTONE, MOTTLED AND DOLOMITE
				WINNIPEG	UPPER UNIT	60	SHALE, GREEN, WAXY, SANDSTONE INTERBEDDED
500					SANDSTONE		SAND, SANDSTONE, QUARTZOSE
550		CAMBRIAN		DEADWOOD		60	SAND, BLACK TO GREEN—GREY WAXY, GLAUCONITIC SILTSTONE & SHALE, GREEN—GREY TO BLACK, VERY EDGE OF S W MANITOBA ONLY
	PRECAMBRIAN						ACID & BASIC CRYSTALLINES & METAMORPHICS



OTHER PRODUCING AREAS

1. Mountainside
2. Regent
3. Deloraine
4. Goodlands
5. Lyleton